Drug Residues

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We are what we eat

We are what we eat eats

Chemicals in food of animal origin

Ensuring chemical food safety

Ensuring chemical food safety

Abraham Lincoln's mother

October 5, 1818

Milk Sickness

Trembles

Puking fever

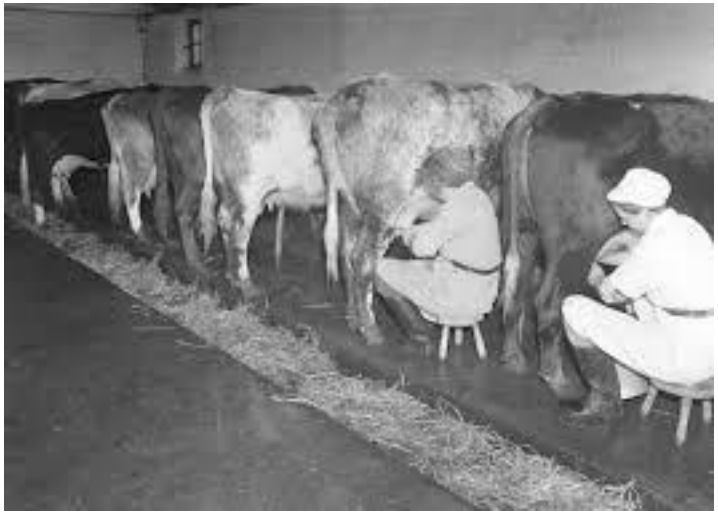
Slows

Sick stomach

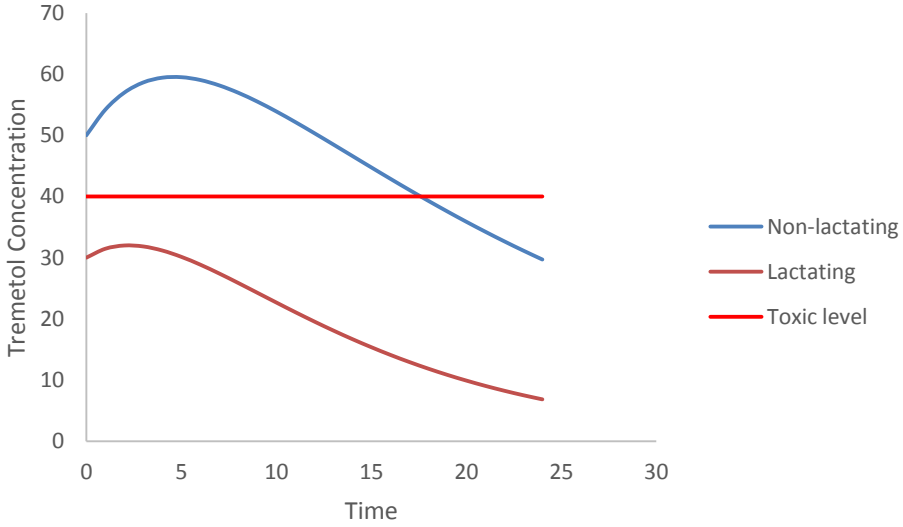
White snakeroot

Tremetol

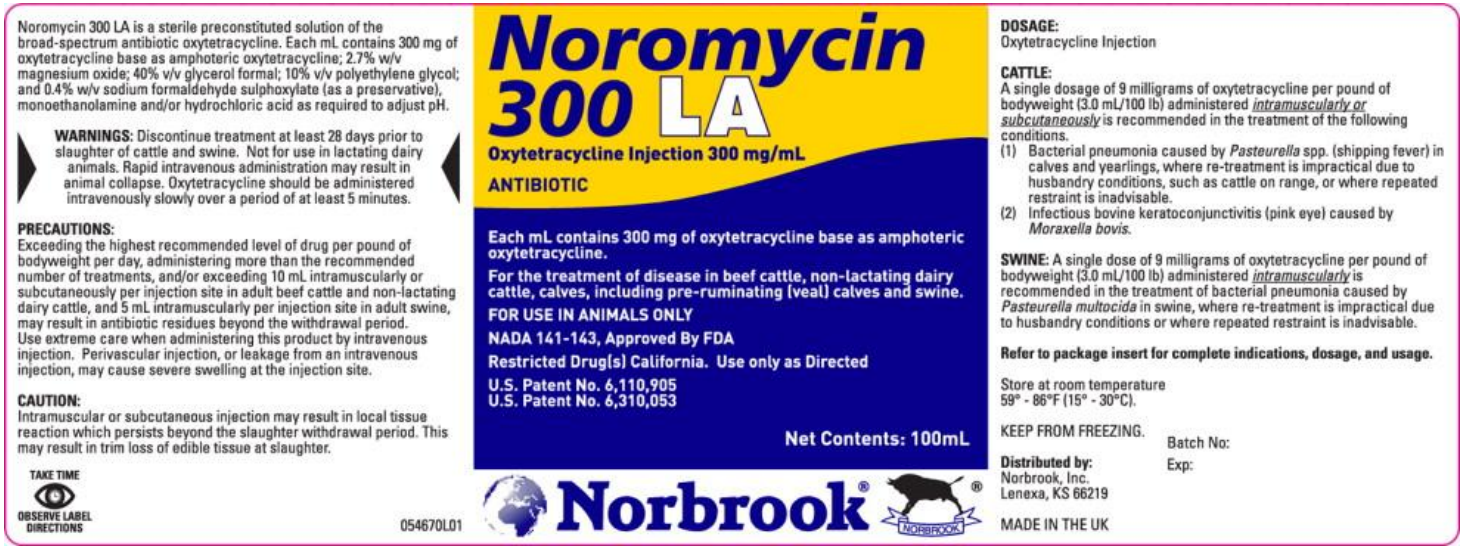
Milk Sickness



Increased clearance



How long do residues persist?



Noromycin 300 LA is a sterile preconstituted solution of the broad-spectrum antibiotic oxytetracycline. Each mL contains 300 mg of oxytetracycline base as amphoteric oxytetracycline; 2.7% w/v magnesium oxide; 40% v/v glycerol formal; 10% v/v polyethylene glycol; and 0.4% w/v sodium formaldehyde sulphoxylate (as a preservative), monoethanolamine and/or hydrochloric acid as required to adjust pH.

WARNINGS: Discontinue treatment at least 28 days prior to slaughter of cattle and swine. Not for use in lactating dairy animals. Rapid intravenous administration may result in animal collapse. Oxytetracycline should be administered intravenously slowly over a period of at least 5 minutes.

PRECAUTIONS:
Exceeding the highest recommended level of drug per pound of bodyweight per day, administering more than the recommended number of treatments, and/or exceeding 10 mL intramuscularly or subcutaneously per injection site in adult beef cattle and non-lactating dairy cattle, and 5 mL intramuscularly per injection site in adult swine, may result in antibiotic residues beyond the withdrawal period. Use extreme care when administering this product by intravenous injection. Perivascular injection, or leakage from an intravenous injection, may cause severe swelling at the injection site.

CAUTION:
Intramuscular or subcutaneous injection may result in local tissue reaction which persists beyond the slaughter withdrawal period. This may result in trim loss of edible tissue at slaughter.

TAKE TIME
OBSERVE LABEL DIRECTIONS

054670L01

Noromycin 300 LA

Oxytetracycline Injection 300 mg/mL

ANTIBIOTIC

Each mL contains 300 mg of oxytetracycline base as amphoteric oxytetracycline.

For the treatment of disease in beef cattle, non-lactating dairy cattle, calves, including pre-ruminating (veal) calves and swine.

FOR USE IN ANIMALS ONLY

NADA 141-143, Approved By FDA

Restricted Drug(s) California. Use only as Directed

U.S. Patent No. 6,110,905
U.S. Patent No. 6,310,053

Net Contents: 100mL

Norbrook®

DOSAGE:
Oxytetracycline Injection

CATTLE:
A single dosage of 9 milligrams of oxytetracycline per pound of bodyweight (3.0 mL/100 lb) administered *intramuscularly or subcutaneously* is recommended in the treatment of the following conditions.
(1) Bacterial pneumonia caused by *Pasteurella* spp. (shipping fever) in calves and yearlings, where re-treatment is impractical due to husbandry conditions, such as cattle on range, or where repeated restraint is inadvisable.
(2) Infectious bovine keratoconjunctivitis (pink eye) caused by *Moraxella bovis*.

SWINE: A single dose of 9 milligrams of oxytetracycline per pound of bodyweight (3.0 mL/100 lb) administered *intramuscularly* is recommended in the treatment of bacterial pneumonia caused by *Pasteurella multocida* in swine, where re-treatment is impractical due to husbandry conditions or where repeated restraint is inadvisable.

Refer to package insert for complete indications, dosage, and usage.

Store at room temperature
59° - 86°F (15° - 30°C).

KEEP FROM FREEZING.

Batch No:
Exp:

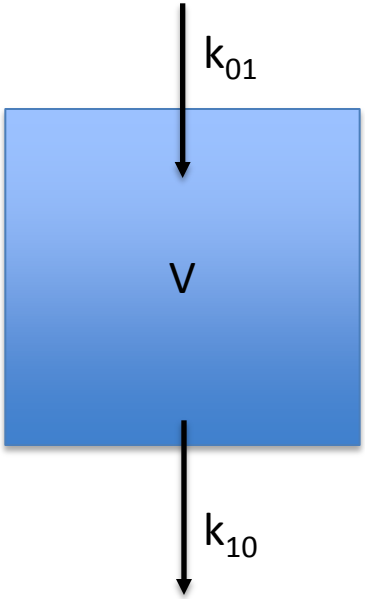
Distributed by:
Norbrook, Inc.
Lenexa, KS 66219

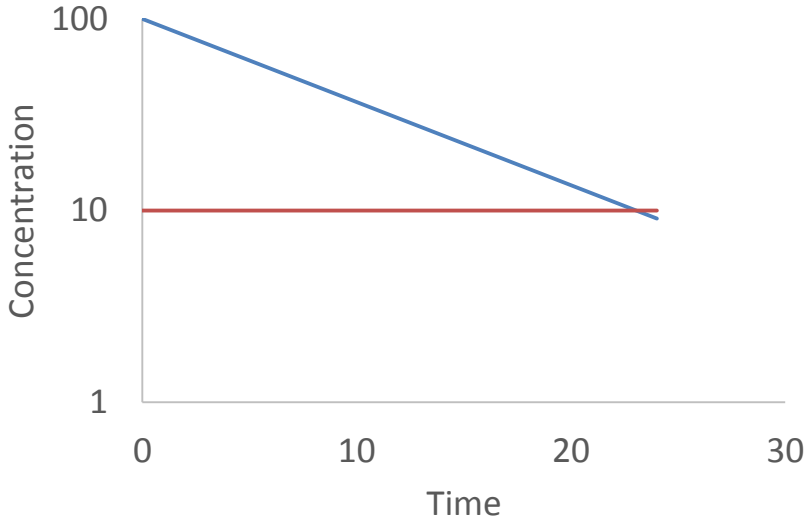
MADE IN THE UK

Setting a withdrawal time

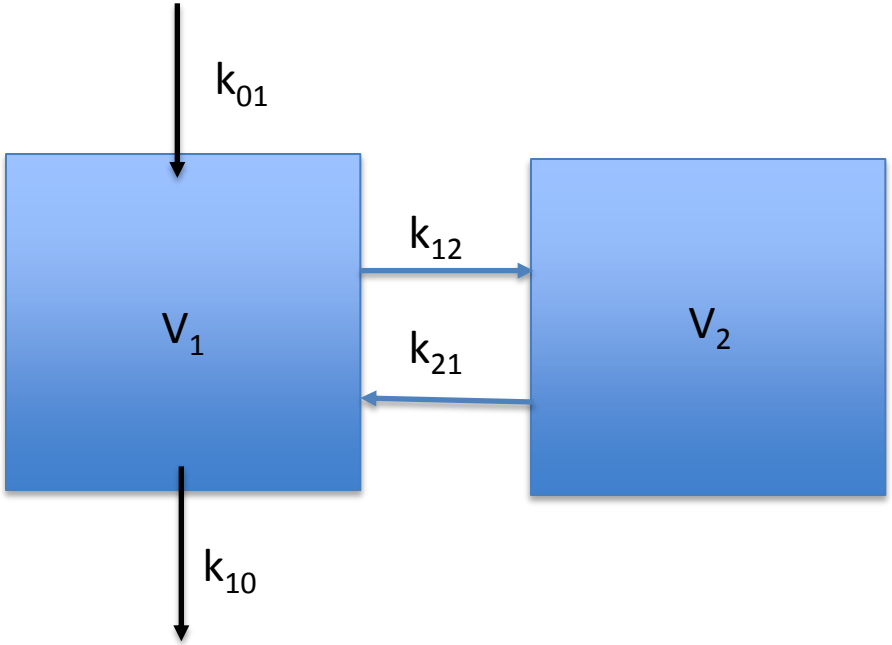
- Oral Toxicity Studies
  - Acute
  - Subacute
  - Chronic
- Tissue residue studies
  - Total residues (radiolabeled)
  - Marker residue

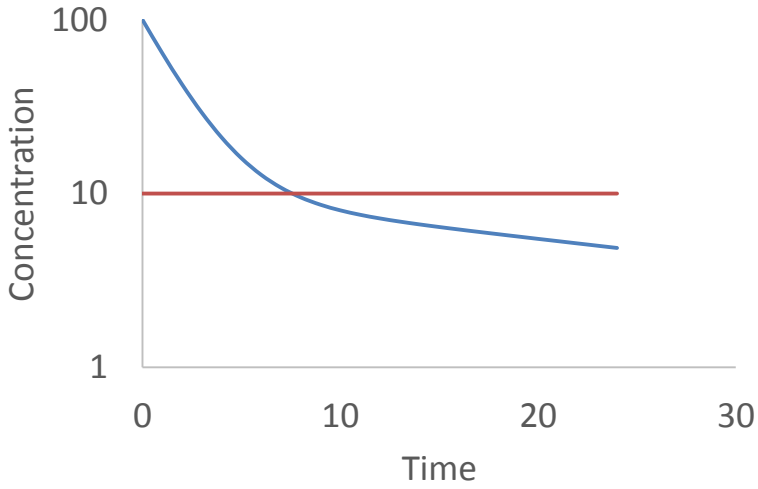
One compartment model



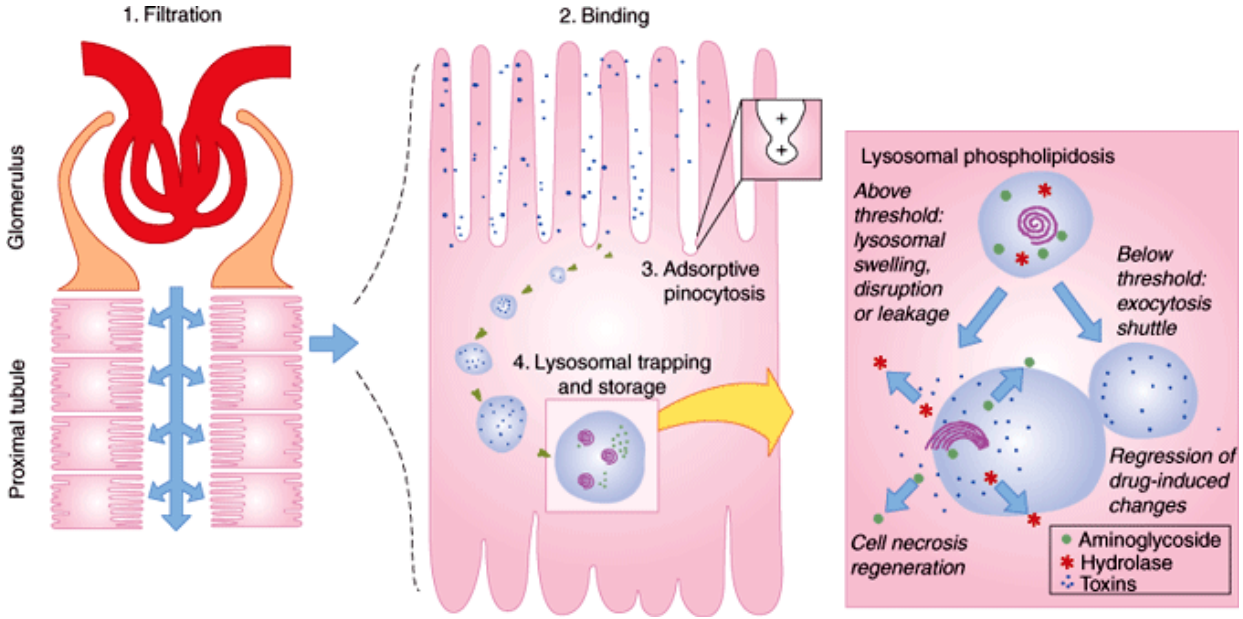


Two compartment model





Aminoglycoside residues



Aminoglycoside residues

Conclusions

1. Consumers must be protected from chemical residues in food of animal origin
2. Requires regulatory oversight (FDA)
   a. Establishing safe concentrations in edible tissues
   b. Setting withdrawal times
   c. Monitoring and testing
3. Challenges
   a. Expensive toxicity and tissue residue studies
   b. Difficult to trace adverse effects directly to food